Information Literacy Research in Asia: A Bibliometric Analysis

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abstract: This bibliometric study looked at the information literacy (IL) literature published by Asian authors, focusing on publishing and citation trends, prolific authors, institutions, countries, collaboration patterns, the thematic evolution of keywords, and factor analysis of keywords, journals, and countries. From the Scopus database, the study's authors extracted bibliographic data on IL from Asian countries. The findings revealed that 20 of 48 countries in Asia produced no publications on the topic. The last few years, however, have seen remarkable growth in Asian IL literature.

The study traces IL in Asia from its emergence in the 1990s through its growth and development. The most prolific authors, countries, institutions, journals, authorship patterns, and collaboration trends are also identified. This is the first bibliometric study examining IL literature published in Asian countries.

Introduction

Since the 1990s, the literature on information literacy (IL) has grown enormously.[1] Moreover, increased recognition of information and communications technology across various fields has accelerated the importance of and need for IL.[2] In the first two decades of the twenty-first century, IL has become essential to all disciplines, environments, and situations. Omwoyo Bosire Onyancha determined that IL is dynamic and distributed across various fields; hence, a collaborative approach is required for its effective delivery and successful functioning in a complex information and knowledge landscape.[3] Prasanna Ranaweera established that information literate individuals improve society's quality of life generally and academically.[4] Noa Aharony declared that people must fully understand IL to recognize its benefits.[5]

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The term *information literacy* was first introduced in 1974 by Paul Zurkowski, the president of the Information Industry Association (now the Software and Information Industry Association). He explained the concept in a proposal to the National Commission on Libraries and Information Science, a United States government agency. Information literate individuals, Zurkowski said, are those who can solve their information problems by using related information sources and applying relevant technology. Since the late 1980s, the topic of IL instruction has been frequently debated in the library and information science (LIS) literature. Information literacy instruction aims to teach people about a library's collections, services, tools, facilities, and general practices.[6] The Association of College and Research Libraries (ACRL) explains IL as "a set of integrated skills that includes the thoughtful discovery of information, understanding how information is produced and its value, and the use of information to create new knowledge, contributing ethically to the learning communities."[7]

Not only individuals but also national and international organizations have realized the importance of IL practice globally. For example, UNESCO works to endow people in all walks of life with IL skills so they can seek, evaluate, use, and create information effectively to achieve their personal, social, occupational, and educational goals.[8] UNESCO defines IL as the ability to identify, comprehend, interpret, generate, communicate, and compute materials in different contexts. Information literacy is a way for people to learn and achieve their goals, develop their knowledge and potential, and be more active in their communities and broader societies.[8] The International Federation of Library Associations and Institutions (IFLA) and other associations have separate groups and chapters for information literacy. In the digital age, IL is a survival skill, whether it is related to education, capital, race, or income.[9]

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IL not only is vital for academia, practitioners, and library professionals but also is a survival skill and a prerequisite to becoming an active citizen, through political participation and informed decision-making in daily life. Comparatively little research has explored the importance of IL in everyday living compared to the ample studies of IL in educational and occupational environments.[10] The concept of IL is used in a broader sense of finding required information and locating relevant sources to meet one's information needs and to become a lifelong learner and knowledgeable citizen. Pradeepa Wijetunge and U. P. Alahakoon state that IL is important for developing countries to bridge the increasing information gap between them and more advanced countries.[11]

The research on IL by Asian countries is still at the beginning stages because these countries have only recently become part of the information culture.[12] Information literacy and information literacy education are crucial for national, social, and personal development in the developing world. Comparative findings from four Asian countries (Japan, China, South Korea, and Taiwan) indicate that, in practice, only a small number of schools actively integrate library-based IL instruction into their curricula. Additionally,

the findings show that effective IL education programs require the participation and collaboration of classroom and subject teachers and administration; such programs cannot rely solely on the efforts of school librarians. Several studies call for the implementation of contextual, situated IL instruction and programs.[13] In Asian countries, IL instruction should be contextually grounded in its definition and practice. Knowledge creation as a product of IL must be both knowledge-based and problem-focused; the contexts of the society must be understood precisely; and information literacy requires policy making and collaboration.[14]

Information literacy literature has grown around the globe, but the pace in the Asian region is relatively slow.

Information literacy literature has grown around the globe, but the pace in the Asian region is relatively slow. Therefore, it is essential to understand the growth of IL publication and citation trends in Asia. The present study aims to present a comprehensive picture of Asian IL literature.

Research Objectives

The research objectives of this study were

1. To find out the publishing and citation patterns of IL output in Asia.
2. To identify the most prolific authors, institutions, countries, and journals and the most highly cited papers on IL in Asian countries.
3. To identify authorship patterns and collaboration trends in IL in Asia.
4. To investigate the thematic evolution of keywords in IL research in Asia.
5. To examine the relationship between three factors (keywords, journals, and countries), using three-factor analysis on IL in Asia.

Literature Review

According to Alan Pritchard, the term *bibliometrics* was coined by Paul Otlet in his book *Traité de documentation* (Documentation treatise) in 1934. He explained bibliometrics as the measurement and evaluation of all aspects of the publication and reading of books and documents. The term was further revised by Pritchard to involve using mathematics and statistical methods to improve books and other media of communication.[15] Bibliometrics is now an established method to examine associations among citations of academic journals, books, articles, and other publications. Bibliometric studies in information literacy employ both quantitative and mixed methods research, ranging from bibliographic surveys to content analysis of the literature. Common areas of study include publication types, leading authors, authorship patterns, top journals, highest citations, major languages, and prominent countries representing scholarly communication in IL. The published bibliometric literature on IL covers the period since 1974, when Zurkowski first coined the term. Therefore, this paper organizes the worldwide development of IL into three eras, the initial period (1974–1989), the growth phase (1990–1999), and the integrative stage (2000–present). The eras are interlinked in their sharing of concepts, processes, instruments, and applications.[16]

Trends in IL research ranged from studies on simple sets of skills to investigations into complex learning behaviors. For example, Anne Lloyd and Kirsty Williamson emphasized the "context" of community, workplace, and academia in explaining the nature and growth of IL. Therefore, they suggested further research and studies on IL in multiple contexts.[17] Aharony reported that IL research was increasing in health and medicine, and scholars have produced rich literature in the emerging area of health literacy.[18] Dare Samuel Adeleke and Evelyn Nkechi Emeahara studied 13 faculties with a population of 6,665 postgraduate students at a university in Nigeria. They disclosed a significant relationship between IL and the use of e-information resources. The two authors suggested including courses on information and communications technology and emphasizing digital information literacy in the curriculum for postgraduate students.[19]

Almost 65 percent of information literacy publication is produced by authors from four predominantly English-speaking countries: the United States, the United Kingdom, Canada, and Australia.

In global bibliometric studies, the United States and the United Kingdom rank as the top countries for publishing IL literature.[20] In a comparative bibliometric study, the United States produced two to three times more literature on health literacy than the 27 member countries of the European Union (EU).[21] In the case of digital literacy, however, Kutty Kumar discovered that the United Kingdom led with 37 articles that appeared in the LISTA database during the 14-year period 1997 to 2011. The United States had 10 articles published during that time.[22] Nearly all global bibliometric studies state that more than 90 percent of IL literature is written in English.[23] Almost 65 percent of information literacy publication is produced by authors from four predominantly English-speaking countries: the United States, the United Kingdom, Canada, and Australia.[24]

In Asia, authors from Singapore, Malaysia,[25] China, India,[26] and Japan[27] contributed notable publications on information literacy in international literature. Raj Kumar Bhardwaj analyzed 1,990 documents from 79 countries in the Scopus database in a study on IL research in social sciences and humanities from 2001 to 2012.[28] Kanwal Ameen and Midrar Ullah revealed that only 13 research papers were published on IL in Pakistan by 2017.[29] Another study found *information literacy* as a keyword phrase in 78 publications by Pakistani authors between 2003 and 2018.[30]

The selection of publication types for bibliometric analysis varied. Journal articles were used in most bibliometric studies on IL, followed by conference proceedings. Other studies included book chapters, book reviews, and letters. Several investigations identified the *Journal of Academic Librarianship* and *Reference Services Review* as major journals that published articles on IL during the period from 1974 to 2014.[31]

Overall, the reviewed literature determined that most of the IL literature published by the developed world came from the United States and the United Kingdom. Asian countries contributed significantly to IL literature, nevertheless. No study has specifically examined the nature of publications on IL or explicitly considered the emerging trends, patterns, citation analysis, authorship patterns, country collaboration, and keywords,

or the relationship among countries, keywords, and journals. This study addresses that gap in the literature and examines the IL literature published by Asian authors.

Method

Bibliometric methods were employed to investigate the publishing patterns and citation trends in IL literature in Asia. Bibliometrics is an established technique in library and information science that applies statistical analysis using bibliographic data. The authors used bibliometrics to identify the publishing trends and citation patterns shown by data from the world's leading indexing and abstracting databases.

Database Selection

Three of the best-known indexing and citation databases are Scopus, Web of Science, and Dimensions. Scopus, an Elsevier product, is the world's largest indexing and citation database of scholarly scientific literature, with more than 75 million records, 24,600 titles, and 5,000 publishers. A significant part of Scopus content coverage (32 percent) consists of social sciences topics with 9,692 titles.[32] Scopus updates its data daily, and 32 percent of all the data is indexed in the domain of the social sciences. Scopus is also a curated, high-quality source of data for bibliometric studies in academic research.[33] Several studies prefer Scopus over other databases, such as Web of Science and Dimensions, due to its extensive coverage.[34] Therefore, the present study chose Scopus for collecting and analyzing data.

Search Query

The authors carried out a comprehensive search query to extract relevant IL literature produced by Asian countries. A list of Asian countries from the Worldometer website (https://www.worldometers.info/) showed 48 countries in the region.[35] Worldometer was voted one of the best free websites for reference sources by the American Library Association.[36] The phrase *information literacy* was put in the search box and then limited to Asian countries. Twenty-eight Asian countries have produced IL literature indexed in Scopus, with nothing from the remaining 20 countries. This search was conducted on November 12, 2021. See the **Appendix for the query.**

Data Selection

The data selection process was comprised of four stages (see Figure 1). In the first stage (identification), the query was run, yielding a total of 1,119 results. Next came the screening stage, in which inclusion and exclusion criteria were applied. In this stage, irrelevant documents (n = 95), including letters, reviews, and duplicated records, were excluded. In the eligibility stage, all records (n = 951) were checked by two team members, and a further 10 records were removed after reading the titles and abstracts. In the final stage, 941 records remained, consisting of 652 articles and 289 conference papers.

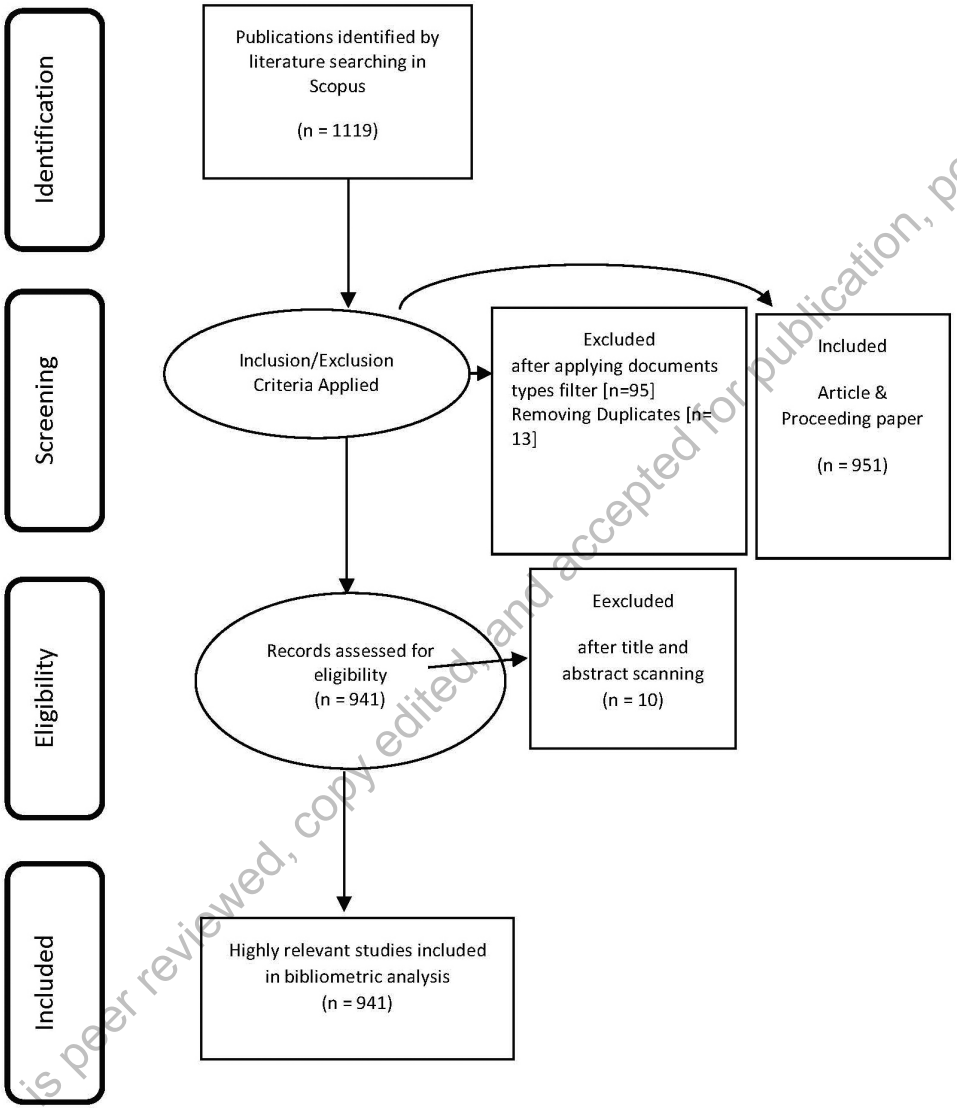

Figure 1. The data gathering process for this article consisted of four phases: (1) identification of publications by searching in Scopus, (2) application of exclusion criteria to remove ineligible records, (3) an additional check of all documents for eligibility, and (4) identification of the final records to be analyzed.

Data Analysis

The data analysis was performed using specialized bibliometric tools. The authors used Microsoft Excel, Microsoft Access, CiteSpace, VOSviewer, Biblioshiny (an R tool), and Gephi software to analyze the data and create visualizations.

IL Publishing and Citation Trends in Asia

Figure 2 shows the publishing and citation trends of IL literature in Asia. The first publication, in 1992, got nine citations. No publications were observed in Asia in 1994, 1995, 1998, or 1999, and no citations in 1994, 1995, 1996, 1998, or 1999. From 1992 to 2000, only eight publications and 38 citations were found. From 2001 to 2010, 149 publications and 1,010 citations were observed in Asia. A boom began after 2006. The development phase from 2011 onward produced 185 publications and 2,712 citations. From 2018 to 2021, remarkable growth was seen in IL literature in Asia. By 2021, the number of publications increased to 174. The leading publications (n = 134) and citations (n = 544) in a single year appeared in 2020 and 2011, respectively.

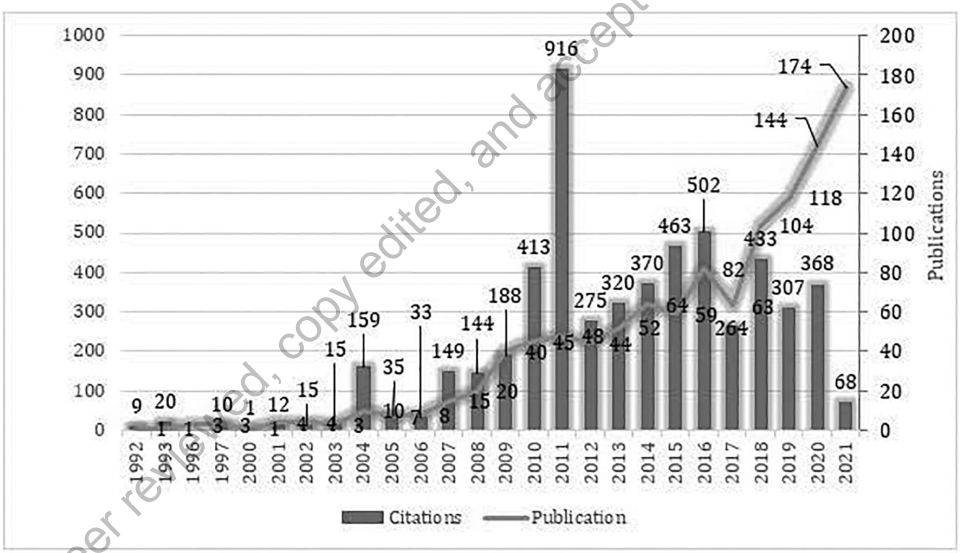

Figure 2. The publications and citation trends in information literacy in Asia from 1992 to 2021.

Prolific Authors

The top 10 prolific authors on IL in Asia are presented in Table 1. Overall, the scholars in the list produced 127 publications and received 2,088 citations. Most of the top authors (n = 7) came from Singapore, where six of them worked at the Nanyang Technological University of Singapore. Three prolific authors were from Pakistan. Shaheen Majid from Nanyang Technological University ranked first with 20 publications, 391 citations, a 19.6 citation impact, and a 9 *h*-index score. Schubert Foo followed with 17 publications and

Table 1.

Most prolific Asian authors on information literacy

Rank	Author	Affiliation and country	Publications	Citations impact	Citation	h-index
1	Shaheen Majid	Nanyang Technological University, Singapore	20	391	19.6	9
2	Schubert Foo	Nanyang Technological University, Singapore	17	368	21.6	8
3	Kanwal Ameen	University of Home Economics, Lahore, Pakistan	14	164	11.7	6
4	Sei-Ching Joanna Sin	Nanyang Technological University, Singapore	12	325	27.1	9
5	Yanru Guo	Nanyang Technological University, Singapore	11	53	4.8	4
6	Intan Azura Mokhtar	National Institute of Education, Singapore	11	291	26.5	6
7	Dion H. Goh	Nanyang Technological University, Singapore	11	53	4.8	4
8	Khalid Mahmood	University of the Punjab, Lahore, Pakistan	11	98	8.9	5
9	Muhammad Asif Naveed	University of Sarghoda, Sarghoda, Pakistan	11	93	8.5	6
10	Brendan Luyt	Nanyang Technological University, Singapore	9	252	28.0	6

368 citations, and Kanwal Ameen with 14 publications and 164 citations. Brendan Luyt of Nanyang Technological University ranked at the bottom of the list with 9 publications and 252 citations. However, his publications have the highest citation impact (28.0).

Prolific Countries and Institutions

Table 2 presents the top countries and Table 3 the leading educational institutions for IL research in Asia. The top 10 countries collectively produced 1,002 publications, which obtained 4,709 citations. China topped the list with the most publications (n = 326) but the fewest citations (n = 567) and the lowest citation impact (1.74). India, Japan, Iran, and Pakistan followed, with 135, 97, 86, and 81 publications, respectively. Singapore produced 70 publications but received the most citations (n = 1,011) and had the highest citation impact (14.44).

Table 2.
Leading countries on information literacy in Asia

Country	Publications	Citations	Citation impact
China	326	567	1.74
India	135	751	5.56
Japan	97	253	2.61
Iran	86	408	4.74
Pakistan	81	590	7.28
Singapore	70	1011	14.44
Malaysia	68	348	5.12
Indonesia	62	121	1.95
South Korea	41	409	9.98
United Arab Emirates	36	251	6.97

The top 10 educational institutions produced 301 publications, which obtained 3,328 citations. Nanyang Technological University emerged as a top-ranked institution with 102 publications, 1,792 citations, and a 17.57 citation impact. It was followed by the University of the Punjab in Lahore, Pakistan; the University of Malaya in Kuala Lumpur, Malaysia; and Huazhong Normal University in Wuhan, China, with 46, 29, and 24 publications, respectively. Wuhan University, Kuwait University, and Universiti Teknologi MARA in Shah Alam, Malaysia, produced 19 publications each. Notably, the National Institute of Education, Singapore, produced only 13 publications; however, its publications had the highest citation impact (20.92).

Table 3.

Leading educational institutions on information literacy in Asia

Institution	Publications	Citations	Citation impact
Nanyang Technological University, Singapore	102	1,792	17.57
University of the Punjab, Lahore, Pakistan	46	419	9.11
University of Malaya, Kuala Lumpur, Malaysia	29	271	9.34
Huazhong Normal University, Wuhan, China	24	39	1.63
Wuhan University, Wuhan, China	19	61	3.21
Kuwait University, Kuwait City	19	111	5.84
Universiti Teknologi MARA, Shah Alam, Malaysia	19	58	3.05
University of Sargodha, Sargodha, Pakistan	16	56	3.50
Bar-Ilan University, Ramat Gan, Israel	14	249	17.79
National Institute of Education, Singapore	13	272	20.92

Preferred Journals

Table 4 presents the top 10 journals cited by Asian researchers on information literacy. These leading journals collectively published 261 papers, which received 1,042 citations. The online journal *Library Philosophy and Practice* ranked first with 107 papers, though it had comparatively low citations (n = 123) as well as a low CiteScore, the yearly average number of citations to recent articles (0.3). It also had a low rating of 1.399 for SNIP (source normalized impact per paper), a measure that corrects for differences in citation practices between disciplines. The journal appeared in Scopus quartile 3, indicating that it ranked in the lowest 50 to 75 percent of listed journals. Springer's journal *Communications in Computer and Information Science*, which publishes proceedings on information sciences, ranked second with 26 publications and 72 citations, followed by *International Information and Library Review* with 26 publications and 79 citations. Notably, the sixth-, seventh-, and eighth-ranked journals had comparatively few publications. These journals received more citations, however, especially the *Journal of Academic Librarianship*, which obtained the most (n = 276).

Highly Cited Papers

Table 5 presents the bibliographic information of the 10 most highly cited papers on IL published by Asian researchers. The years of publication covered 2004 to 2015, and the number of citations ranged from a maximum of 191 to a minimum of 40. Two publications obtained over 100 citations each. The most highly cited paper was "Adopting Evidence-Based Practice in Clinical Decision-Making: Nurses' Perceptions, Knowledge, and Barriers," with 191 citations.[37] The authors of that paper collected data from 1,486

Table 4.

Journals cited by Asian researchers on information literacy

Journal	Publications	Citations	CiteScore*	SCImago Journal Rank	Source normalized impact per paper‡	Scopus quartile§	Publisher	Country
Library Philosophy and Practice	107	123	0.3	0.22	1.399	Q3	University of Nebraska Lincoln	United States
Communications in Computer and Information Science	26	72	0.7	0.188	0.403	Q3	Springer	Germany
International Information and Library Review	26	79	0.9	0.262	0.782	Q2	Taylor & Francis	United Kingdom
Malaysian Journal of Library and Information Science	19	167	1.3	0.414	0.849	Q2	University of Malaya	Malaysia
DESIDOC Journal of Library and Information Technology	18	53	1	0.281	1.968	Q2	Defence Scientific Information & Documentation Centre	India
Journal of Librarianship and	15	75	2.6	0.711	1.674	Q1	SAGE	United States

Journal	Publications	Citations	CiteScore*	SCImago Journal Rank	Source normalized impact per paper‡	Scopus quartile§	Publisher	Country
Information Science								
Library Hi Tech	14	60	3.2	0.541	1.112	Q1	Emerald Group	United Kingdom
Journal of Academic Librarianship	13	276	3	1.165	1.724	Q1	Elsevier	Netherlands
Libri	12	105	1	0.301	0.736	Q2	Walter de Gruyter	Germany
Annals of Library and Information Studies	11	32	0.9	0.178	1.601	Q3	National Institute of Science Communication and Information Resources	India

*CiteScore reflects the yearly average number of citations to recent articles published in a journal.

†SCImago Journal Rank calculates influence by looking at both the number of citations received by a journal and the importance of the journal where the citation was published.

‡Source normalized impact per paper (SNIP) corrects for differences in citation practices between disciplines.

§The Scopus quartile reflects the demand for the journal by scholars. The top 25% of **journals** occupy the first quartile, Q1; **Q2** is occupied by **journals** in the top 25% to 50%, and so on.

respondents at two public hospitals in Singapore. The findings revealed that, although the respondents showed a positive attitude toward evidence-based practices, they were overly occupied with workload and unable keep up with the latest developments in the field. The study recommended information literacy training for the nurses to get IL skills and evidence-based learning. The second most highly cited paper, written by Yoram Eshet-Alkali and Yair Amichai-Hamburger in 2004, described five digital literacy skills (photovisual, reproduction, branching, information skills, and socio-emotional skills). The study determined that younger participants performed better on photovisual and branching literacy tasks than older participants, while older participants did better on replication and knowledge literacy tasks.[38] The third-ranked paper collected data from 282 respondents about their online searching behavior and applied semantic Web analysis through artificial neutral network software.[39]

Some reasons for the popularity of these articles are their use of unique research methods and their innovative analysis and model development (such as evidence-based practices, digital literacy, and semantic Web analysis), confirming that unique or groundbreaking ideas result in better acknowledgment and citations. Similarly, the fourth- and fifth-ranked articles discussed social media use for information seeking.[40] The bottom five articles received 59, 58, 43, 40, and 40 citations, respectively.[41]

Authorship Patterns

Figure 3 highlights the authorship patterns in IL literature in Asia, from a single author to a maximum of 10 coauthors. These patterns produced 941 publications and received 2,760 citations. The two-author pattern emerged as the most common, with the most publications (n = 329) and citations (n = 1,467), followed by an equal number of publications (n = 215) produced by a single author or by three authors. However, the three-author pattern received comparatively higher citations (n = 961). These findings indicate that IL researchers in Asia prefer to work alone or with one or two other authors but dislike collaborating with a large team.

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Country Collaborative Research

Figure 4 depicts the country collaboration map for IL literature produced by Asian authors. The column labeled "From" indicates which country's researchers initiated communication with collaborators in other countries, shown in the column headed "To." A total of 88 collaborations occurred among Asian and other countries globally. China and Iran collaborated with three countries each; Chinese researchers worked with colleagues in the United States, Singapore, and Australia; and Iranian scholars worked with others in Australia, Malaysia, and the United Kingdom. China and the United States emerged as the top collaborating countries with 15 publications each. Overall, this trend shows that Asian researchers prefer to publish with coauthors in their own country.

Table 5.

Papers on information literacy most cited in Asia

Title	Authors	Journal	Year	Total citations	Average yearly citations
"Adopting Evidence-Based Practice in Clinical Decision Making: Nurses' Perceptions, Knowledge, and Barriers"	Shaheen Majid, Schubert Foo, Brendan Luyt, Xue Zhang, Yin-Leng Theng, Yun-Ke Chang, and Intan A. Mokhtar	*Journal of the Medical Library Association*	2011	191	19.10
"Experiments in Digital Literacy"	Yoram Eshet-Alkali and Yair Amichai-Hamburger	*Cyberpsychology & Behavior*	2004	106	6.24
"Convenience or Credibility? A Study of College Student Online Research Behaviors"	J. Patrick Biddix, Chung Joo Chung, and Han Woo Park	*Internet and Higher Education*	2011	73	7.30
"Individual Differences in Social Media Use for Information Seeking"	Kyung-Sun Kim, Sei-Ching Joanna Sin, and Tien-I Tsai	*Journal of Academic Librarianship*	2014	72	10.29
"Selecting Quality Sources: Bridging the Gap between the Perception and Use of Information Sources"	Kyung-Sun Kim and Sei-Ching Joanna Sin	*Journal of Information Science*	2011	61	6.10

"Why Students Share Misinformation on Social Media: Motivation, Gender, and Study-Level Differences"	Xinran Chen, Sei-Ching Joanna Sin, Yin-Leng Theng, and Chei Sian Lee	*Journal of Academic Librarianship*	2015	59	9.83
"Gender Differences in Information Behavior concerning Wikipedia, an Unorthodox Information Source?"	Sook Lim and Nahyun Kwon	*Library and Information Science Research*	2010	58	5.27
"Environmental Scanning: An Application of Information Literacy Skills at the Workplace"	Xue Zhang, Shaheen Majid, and Schubert Foo	*Journal of Information Science*	2010	43	3.91
"Four Quick Flips: Activities for the Information Literacy Classroom"	Ilka Datig and Claire Ruswick	*College & Research Libraries News*	2013	40	5.00
"Knowledge Management and Its Potential Applicability for Libraries"	Maryam Sarrafzadeh, Bill Martin, and Afsaneh Hazeri	*Library Management*	2010	40	3.64

Sr.	From	To	Frequency	Sr.	From	To	Frequency
1	China	United States	15	6	India	United States	4
2	China	Hong Kong	6	7	Iran	Malaysia	4
3	Japan	United States	6	8	Pakistan	United Kingdom	4
4	Iran	Australia	5	9	China	Australia	4
5	China	Singapore	4	10	Iran	United Kingdom	4

Figure 3. Authorship patterns of Asian IL researchers, from a single author to a maximum of 10 authors.

Bibliographic Coupling of the Countries

Maxwell Kessler introduced the concept of bibliographic coupling in 1963.[42] Bibliographic coupling occurs when two publications refer to a third common publication. When two articles refer to a common third work in their reference lists, they are said to be bibliographically coupled. The more works that both articles share in their reference lists, the stronger their bibliographic coupling. The bibliographic coupling of publications of Asian countries is depicted in Figure 5. The minimum occurrence of five publications from each Asian country has been selected, which results in 22 countries above the threshold of Gephi visualization software. The size of the bubbles shows the total link strength of each country. The top five countries based on total link strength, publication, and citations are China, Singapore, Malaysia, Iran, and Pakistan.

Keyword Analysis

Figure 6 presents the keywords on IL literature used by Asian researchers. A total of 2,303 keywords or keyword phrases were employed while producing 941 publications. As a result, 36 keywords out of 2,303 met the threshold. The keywords are connected based on the co-occurrence of two keywords in a single study. The more connections there are, the stronger the link and, as a result, the larger the bubble. The top five key-

Sr.	From	To	Frequency	Sr.	From	To	Frequency
1	China	United States	15	6	India	United States	4
2	China	Hong Kong	6	7	Iran	Malaysia	4
3	Japan	United States	6	8	Pakistan	United Kingdom	4
4	Iran	Australia	5	9	China	Australia	4
5	China	Singapore	4	10	Iran	United Kingdom	4

Figure 4. A map of country collaboration on IL literature. The column labeled "From" indicates which country's researchers initiated communication with scholars in other countries, shown in the column headed "To."

words or keyword phrases are *information literacy*, *information technology*, *higher education*, *education*, and *social media*. They have a strong connection with 416, 24, 23, 22, and 21 occurrences, respectively.

Figure 7 presents the thematic evolution of IL based on the keywords used by authors. The figure identifies the emergence and decline of various topics (or keywords) within IL. The period 1992 to 2021 has been divided into three phases to identify the emergence and decline of topics on IL. For example, "higher education" was a major topic in the first phase (1992–2010). In the second phase (2011–2015), it was replaced by "information literacy" and "information technology." Overall, during the first phase (1992–2010, shown on the left side of the figure), the top three keywords or phrases used by Asian researchers were *information technology*, *information skills*, and *information literacy*. It shows that information literacy was often overshadowed by the topics of information technology and information skills. The second phase (2011 to 2015, in the center of the figure) depicts nine main keywords or phrases used by researchers: *information literacy*, *information technology*, *library*, *information seeking behavior*, *e-learning*, *social media*, *academic libraries*, *information literacy education*, and *literacy*. Notably, some keywords or phrases from the previous era (*communication technologies*, *higher education*, *information*, *information skills*, *university libraries*, *critical thinking*, and *information retrieval*) have been replaced by

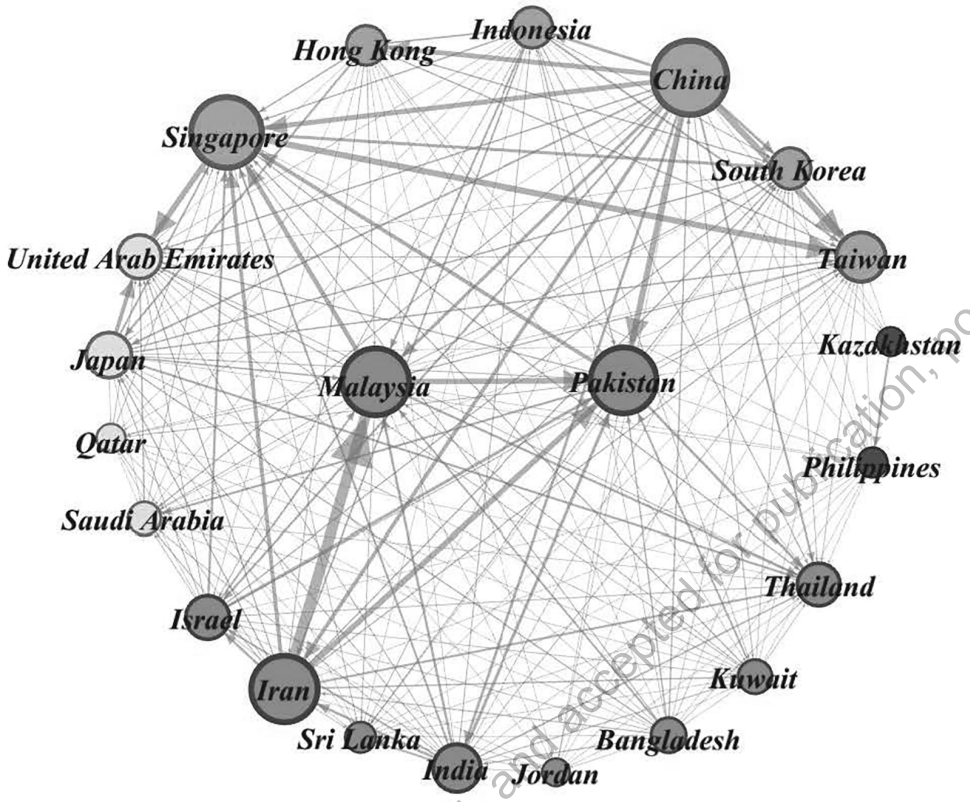

Figure 5. A visualization of bibliographic coupling among Asian countries. When two articles refer to a common third work in their reference lists, they are said to be bibliographically coupled. The size of each country's bubble shows its total link strength. The top five countries based on total link strength, publications, and citations are China, Singapore, Malaysia, Iran, and Pakistan.

new words or phrases (*library*, *information seeking behavior*, *e-learning*, *social media*, *information literacy education*, and *literacy*). This era was marked by the emergence of social media and e-learning in Asia. In the recent phase (2016–2021, depicted on the right side of the figure), the top keywords or phrases used by Asian researchers include not only *information literacy* but also *students*, *social media*, *information literacy education*, *information literacy instructions*, and *academic libraries*. The recent era is also led by the keyword phrases *digital literacy skills* and *ICTs* (information and communications technologies).

Three-Factor Analyses (Keywords, Countries, and Journals)

Figure 8 presents the three-factor relationship between the top countries (center), keywords (left), and journals (right) in IL literature published by Asian researchers. The area or size of the pillar of each entity (whether keyword, country, or journal) shows their contribution. The larger the area, the stronger the relationship and contribution. For example, the authors from China mostly used three main keyword phrases (*information literacy*, *information technology*, and *higher education*) and preferred to publish in two outlets, the *Journal of Physics: Conference Series* and the book series Lecture Notes

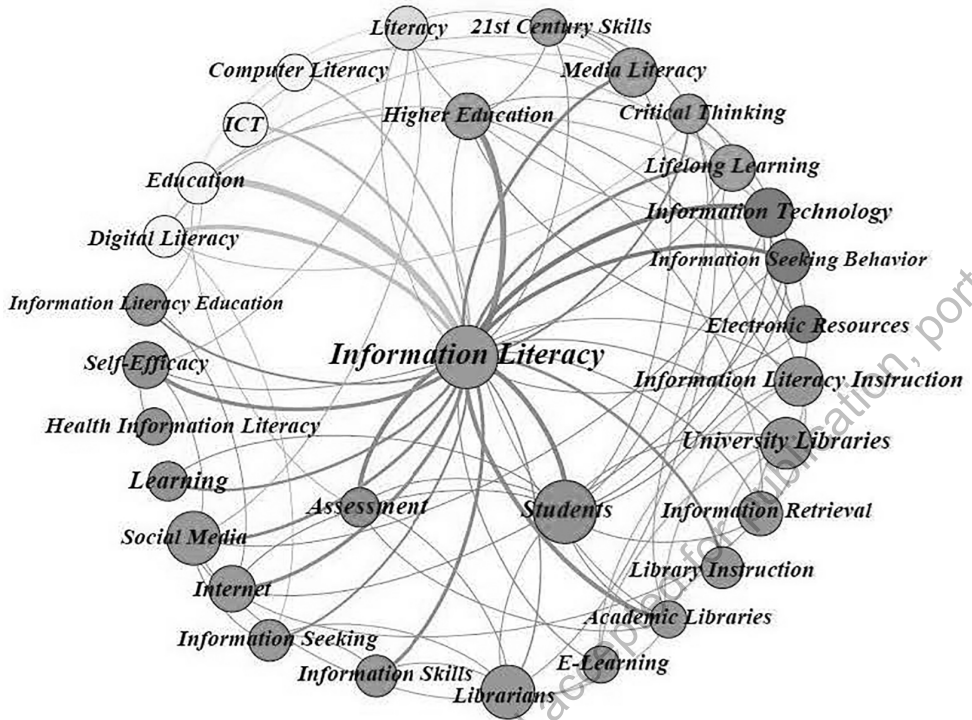

Figure 6. The keywords or keyword phrases most frequently used by Asian authors on information literacy. The top five keywords or phrases are *information literacy*, *information technology*, *higher education*, *education*, and *social media*.

in Electrical Engineering. Overall, the researchers of the top five countries (China, Iran, India, Japan, Malaysia, and Singapore) used mostly five keywords or keyword phrases (*information literacy*, *students*, *education*, *social media*, and *information technology*) and preferred to publish in five prominent journals (*Library Philosophy and Practice*, *Journal of Physics: Conference Series*, *Communications in Computer and Information Science*, *Malaysian Journal of Library and Information Science*, and *Libri*). The researchers of the top country (China) did not favor *Library Philosophy and Practice*, whereas most Indian researchers chose that online journal. A significant number of researchers from Indonesia, Iran, and Pakistan also published in *Library Philosophy and Practice*. Malaysian researchers primarily used *information literacy* as a keyword phrase, and they preferred to publish their IL work in their local journal *Malaysian Journal of Library and Information Science*.

Discussion

The publication of IL started in 1992 in Asia, and until 2000, minimal growth was observed. The progress may have dragged because some countries in Asia were slow to adopt new technology.[43] The amount of IL literature grew from 2000 to 2009, especially after 2006, when the number of publications increased from single digits to double digits (see Figure 2). For the global development of IL, the growth period was 1990 to 1999,[44]

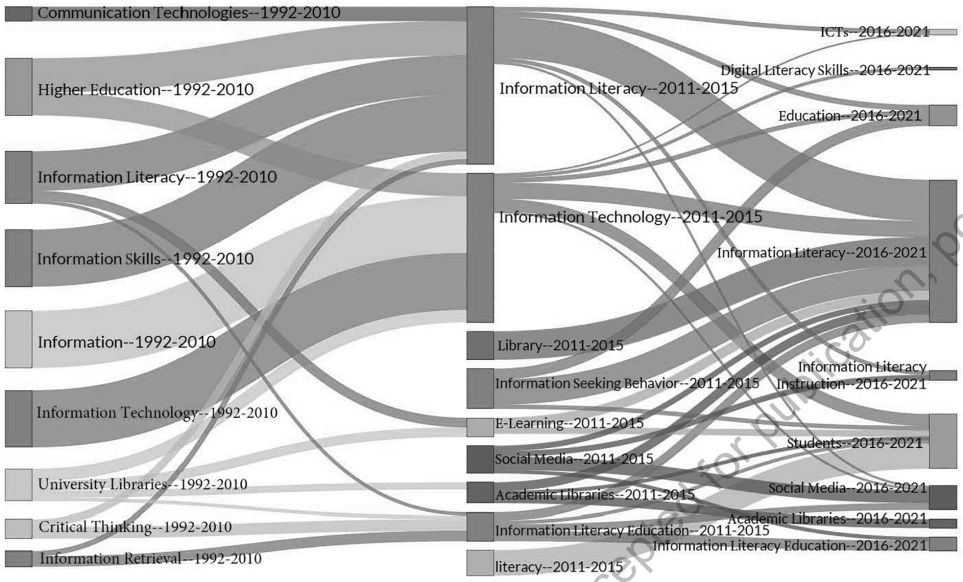

Figure 7. The evolution of topics in information literacy based on the occurrence of keywords or keyword phrases.

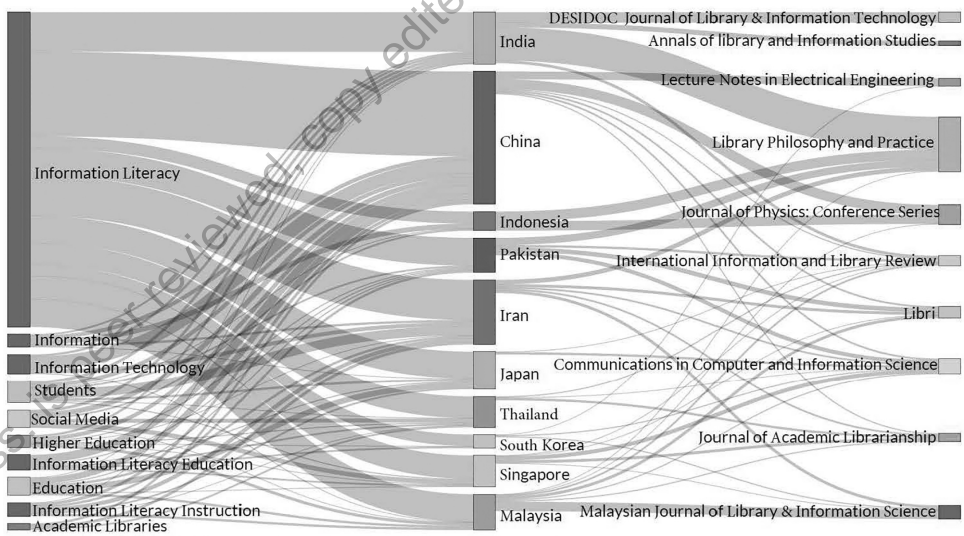

Figure 8. An analysis of keywords and publications preferred by authors on IL in various Asian countries.

suggesting that Asia lags about a decade behind the rest of the world. The number of IL publications in Asia grew exponentially from 2000 to the present, however.[45] A possible reason could be global technological developments and the need for IL skills to retrieve reliable and relevant digital information sources. Researchers, educators, and practitioners have joined hands to conduct empirical studies. Developments in information and communications technology have led to the need for other forms of literacies, especially media, multimedia, digital, citizenship, and intercultural literacies. These advances may have caused remarkable growth in IL literature after 2018 in Asia.

The two most prolific IL authors in Asia, Shaheen Majid and Schubert Foo, were associated with Nanyang Technological University, Singapore. In research and development, this university is highly rated. According to the 2021 QS World University Rankings, Nanyang ranks thirteenth in the world and second in Asia.[46] Moreover, the graph of Singapore's literacy rate shows that from 2000 to 2019, the country's literacy rate increased from 92.5 percent to 97.5 percent.[47] Kanwal Ameen has emerged as the third most prolific author; she recently joined the University of Home Economics in Lahore, Pakistan. Prior to this, Ameen served as a professor in the Department of Information Management at the University of the Punjab in Lahore for more than 35 years. The department is known for its competent faculty, researchers, and high-quality publications. The University of the Punjab has led LIS education and research in Pakistan since 2009, producing more and higher-quality LIS literature than the country's other institutions. These findings support the notion that a positive research culture and advanced infrastructure assist researchers in producing superior literature. Global literature divided IL into three eras: initial (1974–1989), growth (1990–1999), and integrative (1991–date).[48] In Asian countries, however, the initial period was 1992 to 2000, the growth phase was 2001 to 2010, and the developmental period was 2011 onward, with remarkable growth in 2019 and 2020. As a result, no Asian author ranks among the top 10 most prolific authors in global IL literature.[49] Asian countries working with the most advanced and global leaders in IL (such as the United States, United Kingdom, Canada, and Australia) have an opportunity to learn from and advance IL research.

The University of the Punjab has led LIS education and research in Pakistan since 2009, producing more and higher-quality LIS literature than the country's other institutions.

The online journal *Library Philosophy and Practice* was the most productive outlet publishing Asian IL literature. The *Journal of Academic Librarianship* got a higher citation rate and higher impact factor than *Library Philosophy and Practice*, however, despite fewer publications. Article processing at *Library Philosophy and Practice* is quick, and papers appear soon after acceptance. A researcher from Pakistan and another from India who published their IL work in *Library Philosophy and Practice* informed us that the journal's article processing is quick and open access. Their articles appeared online two or three days after acceptance.

Studies that obtained high citations might have done so because the authors used unique methodologies, research designs, or new techniques of analysis to report their findings.[50] Other reasons for high citations might be the journal's popularity, impact score, and quartile, and its reputation in the research community.[51]

In terms of authorship, the most popular pattern in Asia is a single author to three authors. This finding aligns with the prevailing authorship patterns in IL worldwide.[52] China and the United States emerged as the top collaborator countries in IL publications, perhaps because their educational industries are growing fast. The overall collaboration of Asian countries with one another is low.

The keyword analysis revealed that the top five keywords or phrases are *information literacy*, *information technology*, *higher education*, *education*, and *social media*. During two phases (1992–2010 and 2011–2015), the keyword phrase *information literacy* became dominant along with *information technology*. In recent years (2016–2021), however, the phrase *information technology* has been replaced by *information literacy*.

Overall, Asian countries need to collaborate with other countries, particularly developed countries, to learn from and advance IL research. Researchers from academic and practitioner backgrounds can contribute to such research. Library schools and associations can support IL research by providing learning platforms and organizing international conferences, symposiums, and workshops. Joint ventures and international collaborations can also provide an opportunity to close the gap between Asian and leading countries in IL research.

Delimitations and Limitations of the Study

The study was delimited by database selection, a region-specific study period, and document type. Scopus was used for this study, but other indexing and abstracting databases might produce different results. The study focused on IL productivity in Asian countries.

There are 48 countries in Asia. Only 28 countries, however, produced research and conference papers on IL indexed in Scopus.

Implications of the Study

Theoretical Implications

This is the first bibliometric study to look at all the IL literature published in Asian countries. It shows trends and theoretical positioning of this area of study chronologically and geographically. This study identified the overall status of IL in Asia, its publishing and citation trends, top contributing authors, institutions, countries, authorship patterns, and the thematic evolution of keywords. It adds to the limited literature of IL in Asia.

Practical Implications

Of 48 countries in Asia, 20 countries produced no IL literature indexed in Scopus. This indicates a need to promote IL in Asia, mainly focusing on countries that have generated little or no literature on the topic. Various LIS stakeholders in Asian countries, such as library professionals, academicians, researchers, library schools, and professional library associations, must understand the importance of IL and join hands

Of 48 countries in Asia, 20 countries produced no IL literature indexed in Scopus.

to promote IL research for the betterment of the profession as well as to serve library users in a technology-savvy era. The limited country-level collaboration among Asian researchers suggests a need for more international projects. These various stakeholders can play a crucial role in IL research, collaboration, and instruction, deciding the ultimate future of IL in Asia.

Conclusion

This is the first bibliometric study examining the IL literature published by Asian countries. The study identified that 1992–2000 was an initial period in which eight publications appeared in Asia. The growth phase was 2001 to 2010, in which 149 publications came out. The development years were from 2011 onward, in which 185 publications obtained a total of 2,712 citations. The last few years (2018 onward) showed remarkable growth of IL literature in Asia, especially in China, India, Japan, Iran, Pakistan, and Singapore. Multiple factors contributed to this growth, including the multidisciplinary nature of IL, increased collaboration with national and international researchers outside Asia, the availability of multiple publishing platforms (national and international journals), and an increasing number of researchers.

Asia lags comparatively below the global level of IL literature. There is a need to uplift IL research in Asia through increasing collaboration with national and international researchers, particularly involving Asian countries that have made little or no contribution to the field. The role of professional library associations and library schools in Asia will be crucial in nurturing and cultivating research on IL as well as organizing conferences on the topic. International organizations, such as IFLA, the Association for Information Science and Technology (ASIS&T), the Asian Library Association, and the Asian Pacific American Librarians Association (an affiliate of the American Library Association), should work with local national library associations or schools in Asian countries to promote IL research, training, and collaboration. This networking will not only advance IL research but also provide opportunities to better understand IL instruction and programs. It will offer opportunities for library professionals to learn from one another and grasp new skills, expertise, and research knowledge.

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Appendix

The following search query was used to find information literacy literature produced by Asian countries in Scopus:

Query= TITLE-ABS-KEY ("Information Literacy") AND (LIMIT-TO (AFFILCOUNTRY , "China") OR LIMIT-TO (AFFILCOUNTRY , "India") OR LIMIT-TO (AFFILCOUNTRY , "Japan") OR LIMIT-TO (AFFILCOUNTRY , "Iran") OR LIMIT-TO (AFFILCOUNTRY , "Singapore") OR LIMIT-TO (AFFILCOUNTRY , "Malaysia") OR LIMIT-TO (AFFILCOUNTRY , "Pakistan") OR LIMIT-TO (AFFILCOUNTRY , "Indonesia") OR LIMIT-TO (AFFILCOUNTRY , "United Arab Emirates") OR LIMIT-TO (AFFILCOUNTRY , "South Korea") OR LIMIT-TO (AFFILCOUNTRY , "Thailand") OR LIMIT-TO (AFFILCOUNTRY , "Israel") OR LIMIT-TO (AFFILCOUNTRY , "Kuwait") OR LIMIT-TO (AFFILCOUNTRY , "Saudi Arabia") OR LIMIT-TO (AFFILCOUNTRY , "Qatar") OR LIMIT-TO (AFFILCOUNTRY , "Sri Lanka") OR LIMIT-TO (AFFILCOUNTRY , "Bangladesh") OR LIMIT-TO (AFFILCOUNTRY , "Philippines") OR LIMIT-TO (AFFILCOUNTRY , "Jordan") OR LIMIT-TO (AFFILCOUNTRY , "Kazakhstan") OR LIMIT-TO (AFFILCOUNTRY , "Georgia") OR LIMIT-TO (AFFILCOUNTRY , "Oman") OR LIMIT-TO (AFFILCOUNTRY , "Cyprus") OR LIMIT-TO (AFFILCOUNTRY , "Lebanon") OR LIMIT-TO (AFFILCOUNTRY , "Viet Nam") OR LIMIT-TO (AFFILCOUNTRY , "Bhutan") OR LIMIT-TO (AFFILCOUNTRY , "Iraq") OR LIMIT-TO (AFFILCOUNTRY , "Nepal")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp"))

Notes

1. Abdullah Abrizah, Awang Ngah Zainab, K. Kiran, and Ram Gopal Raj, "LIS Journals Scentific Impact and Subject Categorization: A Comparison between Web of Science and Scopus," *Scientometrics* 94, 2 (2013): 721–40, https://doi.org/10.1007/s11192-012-0813-7; Omwoyo Bosire Onyancha, "Knowledge Visualization and Mapping of Information Literacy, 1975–2018," *IFLA* [International Federation of Library Associations and Institutions] *Journal* 46, 2 (2020): 107–23, https://doi.org/10.1177/0340035220906536.
2. Eun-Jin Choi, Jeong-Hye Park, and Se-Won Kang, "Nursing Students' Acceptance Intention of a Smart Device, Information Literacy, and Problem-Solving Confidence," in *Healthcare* 9, 9 (2021): 1157, https://doi.org/10.3390/healthcare9091157.
3. Onyancha, "Knowledge Visualization and Mapping of Information Literacy."
4. Prasanna Ranaweera, "Importance of Information Literacy Skills for an Information Literate Society," presentation at National Conference in Library and Information Science, Colombo, Sri Lanka, June 24, 2008, http://eprints.rclis.org/11956/1/Microsoft_Word_-_Prasanna_2.pdf.
5. Noa Aharony, "Information Literacy in the Professional Literature: An Exploratory Analysis," *Aslib Proceedings* 62, 3 (2010): 261–82, https://doi.org/10.1108/00012531011046907.
6. Jagtar Singh and Caroline M. Stern, "Placing Information Literacy Skills at the Core of Instruction to Promote Critical Thinking." *ICAL* [International Conference of Asian Libraries] *Library Services* (2009): 545–49, http://crl.du. ac.in/ical09/papers/index_files/ical-91_240_565_RV.pdf.
7. Association of College and Research Libraries (ACRL), "Framework for Information Literacy for Higher Education," 2016, https://www.ala.org/acrl/standards/ilframework.
8. Forest Woody Horton Jr., *Understanding Information Literacy: A Primer* (United Nations Education, Cultural and Scientific Organization [UNESCO]: Paris, 2007), https://ifap.ru/library/book261.pdf.

9. Choi, Park, and Kang, "Nursing Students' Acceptance Intention of a Smart Device, Information Literacy, and Problem-Solving Confidence."
10. Konstantina Martzoukou and Elham Sayyad Abdi, "Towards an Everyday Life Information Literacy Mind-Set: A Review of Literature," *Journal of Documentation* 73, 4 (2017): 643–65, https://doi.org/10.1108/JD-07-2016-0094.
11. Pradeepa Wijetunge and U. P. Alahakoon, "Empowering 8: The Information Literacy Model Developed in Sri Lanka to Underpin Changing Education Paradigms of Sri Lanka," *Sri Lankan Journal of Librarianship and Information Management*, 1, 1 (2005), https://doi.org/10.4038/sllim.v1i1.430.
12. C. R. Karisiddappa, Brij Mohan Gupta, and Ashok Kumar, "Bibliometric Study of Global Information Literacy Research during 2000–2019," *International Journal of Information Dissemination and Technology* 10, 2 (2020): 103–9, https://doi.org/10.5958/2249-5576.2020.00018.7.
13. Patrick Lo, Joyce Chao-chen Chen, Zvjezdana Dukic, You-ra Youn, Yuji Hirakue, Masaaki Nakahima, and Guanghui Yang, "The Roles of the School Librarians as Information Literacy Specialists: A Comparative Study between Hong Kong, Shanghai, South Korea, Taipei and Japan," *New Library World* 115, 7–8, (2014): 314–40, https://doi.org/10.1108/NLW-01-2014-0012.
14. Daniel G. Dorner, G. E. Gorman, and Nicole M. Gaston, "Developing Contextual Perceptions of Information Literacy and Information Literacy Education in the Asian Region," chap. 7 in *Library and Information Science Trends and Research: Asia-Oceania,* Amanda Spink and Diljit Singh, eds. (Bingley, UK: Emerald, 2012), 151–72.
15. Alan Pritchard, "Statistical Bibliography or Bibliometrics?" *Journal of Documentation* 25, 4 (1969): 348–49.
16. María Pinto, María Isabel Escalona-Fernández, and Antonio Pulgarín, "Information Literacy in Social Sciences and Health Sciences: A Bibliometric Study (1974–2011)," *Scientometrics* 95, 3 (2013): 1071–94, https://doi.org/10.1007/s11192-012-0899-y.
17. Anne Lloyd and Kirsty Williamson, "Towards an Understanding of Information Literacy in Context: Implications for Research," *Journal of Librarianship and information Science* 40, 1 (2008): 3–12, https://doi.org/10.1177/0961000607086616.
18. Aharony, "Information Literacy in the Professional Literature."
19. Dare Samuel Adeleke and Evelyn Nkechi Emeahara, "Relationship between Information Literacy and Use of Electronic Information Resources by Postgraduate Students of the University of Ibadan," *Library Philosophy & Practice* (2016).
20. Aharony, "Information Literacy in the Professional Literature"; Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences"; Shankar Reddy Kolle, "Global Research on Information Literacy: A Bibliometric Analysis from 2005 to 2014," *Electronic Library* 35, 2 (2017): 283–98, https://doi.org/10.1108/EL-08-2015-0160; Shaheen Majid, Yun-Ke Chang, Nu Aye Hnin, May Win Khine Ma, and Yu Wai San, "Analyzing Publishing Trends in Information Literacy Literature: A Bibliometric Study," *Malaysian Journal of Library & Information Science* 20, 2 (2015): 51–66.
21. Barbara K. Kondilis, Ismene J. Kiriaze, Anastasia P. Athanasoulia, and Matthew E. Falagas, "Mapping Health Literacy Research in the European Union: A Bibliometric Analysis," *PloS One* 3, 6 (2008), https://doi.org/10.1371/journal.pone.0002519.
22. Kutty Kumar, "A Scientometric Study of Digital Literacy in Online Library Information Science and Technology Abstracts (LISTA)," *Library Philosophy and Practice* (2014): 1–13, https://digitalcommons.unl.edu/libphilprac/1044/.
23. Ming-Yueh Tsay and Bih-Ling Fang, "A Bibliometric Analysis on the Literature of Information Literacy," *Journal of Educational Media & Library Sciences* 44, 2 (2006); Anna Marie Johnson, Claudene Sproles, Robert Detmering, and Jessica English, "Library Instruction and Information Literacy 2011," *Reference Services Review* 40, 4: 601–703, https://doi.org/10.1108/00907321211277396; Aharony, "Information Literacy in the Professional Literature."

24. Majid, Chang, Hnin, Ma, and San, "Analyzing Publishing Trends in Information Literacy Literature."
25. Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences."
26. Aharony, "Information Literacy in the Professional Literature."
27. Mohammad Nazim and Moin Ahmad, "Research Trends in Information Literacy: A Bibliometric Study," *SRELS* [Sarada Ranganathan Endowment for Library Science] *Journal of Information Management* 44, 1 (2007): 53–62, http://www.srels.org/index.php/sjim/article/view/44089.
28. Raj Kumar Bhardwaj, "Information Literacy Literature in the Social Sciences and Humanities: A Bibliometric Study," *Information and Learning Science* 118, 1–2 (2017): 67–89, https://doi.org/10.1108/ILS-09-2016-0068.
29. Kanwal Ameen and Midrar Ullah, "Information Literacy Instruction: An Overview of Research and Professional Development in Pakistan," in *European Conference on Information Literacy* (Springer: Cham, Switz., 2016), 555–62, https://doi.org/10.1007/978-3-319-52162-6_55.
30. Nadeem Siddique, Shafiq Ur Rehman, Muhammad Ajmal Khan, and Asif Altaf, "Library and Information Science Research in Pakistan: A Bibliometric Analysis, 1957–2018," *Journal of Librarianship and Information Science* 53,1 (2021): 89–102, https://doi.org/10.1177/0961000620921930.
31. Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences"; Majid, Chang, Hnin, Ma, and San, "Analyzing Publishing Trends in Information Literacy Literature"; Kolle, "Global Research on Information Literacy."
32. Elsevier, "Scopus® Data: Curated, Connected, Complete," 2021, https://www.elsevier.com/solutions/scopus.
33. Jeroen Baas, Michiel Schotten, Andrew Plume, Grégoire Côté, and Reza Karimi, "Scopus as a Curated, High-Quality Bibliometric Data Source for Academic Research in Quantitative Science Studies," *Quantitative Science Studies* 1, 1 (2020): 377–86, https://doi.org/10.1162/qss_a_00019.
34. Seema Gul, Shafiq Ur Rehman, Murtaza Ashiq, and Amira Khattak, "Mapping the Scientific Literature on COVID-19 and Mental Health," *Psychiatria Danubina* [Danubian psychiatry] 32, 3–4 (2020): 463–71, https://doi.org/10.24869/psyd.2020.463; Shaista Rashid, Amira Khattak, Murtaza Ashiq, Shafiq Ur Rehman, and Muhammad Rashid Rasool, "Educational Landscape of Virtual Reality in Higher Education: Bibliometric Evidences of Publishing Patterns and Emerging Trends," *Publications* 9, 2 (2021): 1–17; Karim A. Jabali, Murtaza Ashiq, Shakil Ahmad, and Shafiq Ur Rehman, "A Bibliometric Analysis of Research Productivity on Diabetes Modeling and Artificial Pancreas 2001 to 2020," *Library Philosophy and Practice* (2020), https://digitalcommons.unl.edu/libphilprac/4305.
35. Worldometer, "Countries in Asia," 2021, https://www.worldometers.info/geography/how-many-countries-in-asia/.
36. Reference and User Services Association (RUSA), "Best Free Reference Web Sites 2011 13th Annual List RUSA Emerging Technologies in Reference Section (MARS)," 2011, http://www.ala.org/rusa/sections/mars/marspubs/marsbestfreewebsites/marsbestref2011.
37. Shaheen Majid, Schubert Foo, Brendan Luyt, Xue Zhang, Yin-Leng Theng, Yun-Ke Chang, and Intan A. Mokhtar, "Adopting Evidence-Based Practice in Clinical Decision Making: Nurses' Perceptions, Knowledge, and Barriers," *JMLA: Journal of the Medical Library Association* 99, 3 (2011): 229, https://doi.org/10.3163/1536-5050.99.3.010.
38. Yoram Eshet-Alkalai and Yair Amichai-Hamburger, "Experiments in Digital Literacy," *CyberPsychology & Behavior* 7, 4 (2004): 421–29, https://doi.org/10.1089/cpb.2004.7.421.
39. J. Patrick Biddix, Chung Joo Chung, and Han Woo Park, "Convenience or Credibility? A Study of College Student Online Research Behaviors," *The Internet and Higher Education* 14, 3 (2011): 175–82, https://doi.org/10.1016/j.iheduc.2011.01.003.

40. Kyung-Sun Kim, Sei-Ching Joanna Sin, and Tien-I. Tsai, "Individual Differences in Social Media Use for Information Seeking," *Journal of Academic Librarianship* 40, 2 (2014): 171–78, https://doi.org/10.1016/j.acalib.2014.03.001; Kyung-Sun Kim and Sei-Ching Joanna Sin, "Selecting Quality Sources: Bridging the Gap between the Perception and Use of Information Sources," *Journal of Information Science* 37, 2 (2011): 178–88, https://doi.org/10.1177/0165551511400958.
41. Xinran Chen, Sei-Ching Joanna Sin, Yin-Leng Theng, and Chei Sian Lee, "Why Students Share Misinformation on Social Media: Motivation, Gender, and Study-Level Differences," *Journal of Academic Librarianship* 41, 5 (2015): 583–92, https://doi.org/10.1016/j.acalib.2015.07.003; Sook Lim and Nahyun Kwon, "Gender Differences in Information Behavior Concerning Wikipedia, An Unorthodox Information Source?" *Library & Information Science Research* 32, 3 (2010): 212–20, https://doi.org/10.1016/j.lisr.2020.01.003; Xue Zhang, Shaheen Majid, and Schubert Foo, "Environmental Scanning: An Application of Information Literacy Skills at the Workplace," *Journal of Information Science* 36, 6 (2010): 719–32, https://doi.org/10.1177/0165551510385644; Ilka Datig and Claire Ruswick, "Four Quick Flips: Activities for the Information Literacy Classroom," *College & Research Libraries News* 74, 5 (2013): 249–57, https://doi.org/10.5860/crln.74.5.8946.
42. M. M. Kessler, "Bibliographic Coupling between Scientific Papers," *American Documentation* 14, 1 (1963): 10–25, https://doi.org/10.1002/asi.5090140103.
43. Raphael Bergoeing, Norman Loayza, and Facundo Piguillem, "Why Are Developing Countries So Slow in Adopting New Technologies? The Aggregate and Complementary Impact of Micro Distortions," World Bank Policy Research Working Paper, 2013, https://doi.org/10.1596/1813-9450-5393.
44. Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences."
45. Aharony, "Information Literacy in the Professional Literature."
46. QS Quacquarelli Symonds, "QS World University Rankings 2021," https://www.topuniversities.com/university-rankings/world-university-rankings/2021.
47. Statista, "Literacy Rate for People 15 Years and Older in Singapore from 2011 to 2020," 2021, https://www.statista.com/statistics/994945/singapore-literacy-rate-15-years-and-older/.
48. Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences."
49. Kolle, "Global Research on Information Literacy"; Majid, Chang, Hnin, Ma, and San, "Analyzing Publishing Trends in Information Literacy Literature"; Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences"; Manoj Kumar Verma and Ravi Shukla, "Mapping the Research Trends on Information Literacy of Selected Countries during 2008–2017: A Scientometric Analysis," *DESIDOC* [Defence Scientific Information & Documentation Centre] *Journal of Library & Information Technology* 39, 3 (2019): 125–30, https://doi.org/10.14429/djlit.39.3.14007.
50. Shaista Rashid, Amira Khattak, Murtaza Ashiq, Shafiq Ur Rehman, and Muhammad Rashid Rasool, "Educational Landscape of Virtual Reality in Higher Education: Bibliometric Evidences of Publishing Patterns and Emerging Trends," *Publications* 9, 2 (2021): 17; Saleem, Farida, Amira Khattak, Shafiq Ur Rehman, and Murtaza Ashiq, "Bibliometric Analysis of Green Marketing Research from 1977 to 2020," *Publications* 9, 2 (2021), https://doi.org/10.3390/publications9020017.
51. Murtaza Ashiq, Shafiq Ur Rehman, Dilnaz Muneeb, and Shakil Ahmad, "Global Research on Library Service Quality: A Bibliometric Analysis and Knowledge Mapping," *Global Knowledge, Memory and Communication* (2021), https://doi.org/10.1108/GKMC-02-2021-0026.
52. –Pinto, Escalona-Fernández, and Pulgarín, "Information Literacy in Social Sciences and Health Sciences."